

**What is Claim d is:**

1. An isolated nucleic acid which encodes a phytase having a specific activity of at least about 20 U/mg protein, wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes,

wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute.

2. The isolated nucleic acid according to claim 1, wherein the nucleic acid is a DNA molecule.

3. A vector comprising:

an isolated DNA molecule which encodes a phytase having a specific activity of at least about 20 U/mg protein, wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes,

wherein the isolated DNA molecule hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.5% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute,

wherein the DNA molecule is functionally linked to regulatory sequences capable of expressing a phytase from said DNA sequence.

4. The vector according to claim 3 wherein the, DNA molecule further comprises a leader sequence capable of

providing for the secretion of said phytase.

5. A prokaryotic host cell transformed by a nucleic acid, wherein the nucleic acid is an isolated nucleic acid which encodes a phytase having a specific activity of at least about 20 U/mg protein,

wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes,

wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute.

6. A prokaryotic host cell according to claim 5, wherein the host cell is selected from the group comprising *E. coli*, *Bacillus* sp., *Lactobacillus* sp. and *Lactococcus* sp.

7. A eukaryotic host cell or organism transformed by a nucleic acid, wherein the nucleic acid is an isolated nucleic acid which encodes a phytase having a specific activity of at least about 20 U/mg protein,

wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes,

wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute.

8. A eukaryotic host cell or organism according to claim 7, wherein the host cell is selected from the group comprising *Aspergillus* sp., *Humicola* sp., *Pichia* sp., *Trichoderma* sp. *Saccharomyces* sp. and plants such as soybean, corn and rapeseed.

9. A method for the production of phytase comprising:  
transforming a prokaryotic host cell with an isolated nucleic acid, wherein the isolated nucleic acid encodes a phytase having a specific activity of at least about 20 U/mg protein, wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes, wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute;  
culturing or cultivating the prokaryotic host cell under conditions effective for producing phytase; and  
recovering phytase.

10. A method for the production of a nucleic acid which encodes a phytase, wherein a probe comprising a nucleic acid which encodes a phytase is hybridized to a sample suspected of containing said nucleic, under standard hybridization conditions either in 6xSSC, 0.6% SDS, 50°C overnight or functional equivalents thereof for Southern blotting or for PCR 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of metlting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extensioin at 72°C for 1 minute,  
wherein the nucleic acid which encodes a phytase has a specific activity of at least about 20 U/mg protein,  
wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM

Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes, wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute.

11. A method for the production of phytase comprising:  
transforming a eukaryotic host cell with an isolated nucleic acid, wherein the isolated nucleic acid encodes a phytase having a specific activity of at least about 20 U/mg protein, wherein said specific activity is determined by incubating said phytase in a solution containing about 100 mM Tris-HCl, at a pH of about 7.5, about 1 mM  $\text{CaCl}_2$ , and about 1.6 mM sodium phytate at about 37°C for about 30 minutes, wherein the isolated nucleic acid hybridizes to SEQ. ID. No. 1 under standard conditions either in 6xSSC, 0.6% SDS, 50°C overnight for Southern blotting or for PCR: 5 mM  $\text{Mg}^{2+}$ , Taq enzyme, premelting, 94°C for 2 minutes and 30 cycles of melting at 92°C for 20 seconds, annealing at 50°C for 30 seconds and extension at 72°C for 1 minute;  
culturing or cultivating the eukaryotic host cell under conditions effective for producing phytase; and  
recovering phytase.